

ABSTRACT

Movement of a graphical hand is constrained when the physical hand controlling the graphical hand does not have a similar physical constraint. An analysis of a revolute-joint-link-spring model in which an uncompressed/unextended spring position represents the corresponding measured joint angle or link position is used. Linear springs, non-linear springs, or the like may be employed to obtain the desired result of allowing a graphical joint or link to deviate from what the corresponding measured joint or link provides. If a graphical hand configuration causes a portion of the hand to penetrate a simulated graphical solid object, a mathematical determination is used to compute modified joint and link positions such that the graphical hand part will no longer penetrate the solid object. Such a constraint technique may include solving a spring model such that the various joint and link springs compress or extend to produce modified joint and link positions.